UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,100	09/18/2003	Takahiro Matsumoto	1232-5157	6139

27123 7590 07/14/2006		EXAMINER
MORGAN & FINNEGAN, L.L.P. 3 WORLD FINANCIAL CENTER NEW YORK, NY 10281-2101		EVERHART, CARIDAD

ART UNIT	PAPER NUMBER
2891	

DATE MAILED: 07/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/665,100	MATSUMOTO ET AL.
	Examiner	Art Unit
	Caridad M. Everhart	2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>01 May 2006</u>.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>24,26-28,31 and 33-37</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>24,26-28,31 and 33-37</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>5-1-06</u>.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____ .

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5-1-2006 has been entered.

Response to Arguments

Applicant has argued that Kikuchi teaches merely determining overlay difference and implementing step 268 when the difference is large and step 270 when the difference is small. Applicant further argues that applicant's position finding method is a method of processing image data with a plurality of signal processing methods to find a position of a mark combining each of the sample regions with any one of the plurality of methods.

These arguments are respectfully not found to be persuasive for the following reasons. While it is true that Kikuchi does teach the choosing between step 268 and step 270, Kikuchi discloses in addition the following: a method of finding mark positions in which a determination is made if there are nonlinear components to the error between shots and if the answer is yes, one method of correction function is performed(paragraphs 0171, 0172, 0173, and 0174). If there is not nonlinear component to the error, then a different correction function is used(paragraphs 0223
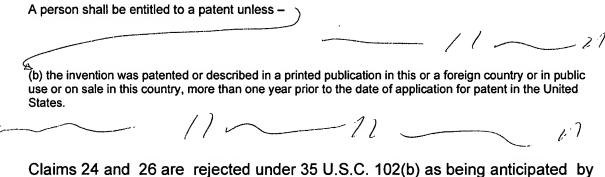
and 0224). The EGA method is useful for the linear example(paragraph 0296), and the

weighted EGA method is useful for the nonlinear example(paragraphs 0014, 0016, and

313). The EGA method used statistical computation such as least squares

method(paragraph 0008). The position deviations are calculated using sum of squares

calculations(paragraphs 0017 and 0019). The method minimizes the error in the

projection image(paragraphs 230, 0232 and 241) and the apparatus for carrying out

the steps is also disclosed including RAM, lithography apparatus and computer and

exposure apparatus(Fig. 2, paragraphs 0121, 160, 0112, 0169, 0226, and 0228).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 24 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by

Kikkuchi (US 20020042664A1).

Kikuchi discloses a detection step of detecting an image of a plurality of areas of

a wafer(paragraph 0006 discloses that an alignment mark is provided in a plurality of

shot areas of a wafer). There is a processing step of processing using a plurality of

methods(in paragraph 0096 is described a subroutine 268; in paragraph 0104 is

described a subroutine 270). Expressions are obtained for both methods(paragraph

0240 describes that expressions are obtained for algorithm 268; paragraph 0237

describes that statistical computations are carried out in subroutine 270). Positions are

obtained by these algorithms, as this is the shot data(paragraph 0006). There is an

evaluation step in which the method in which the position error is minimized is

chosen(paragraph 0254 describes that subroutine 268 or 270 is chosen). The error in

the position is the difference between a position of a mark obtained by the signal

processing step and that obtained by a calculated function(paragraph 0317; paragraph

0197 gives a definition of the deviation or error in a coordinate). A template would be

the curve which corresponds to the function, so therefore Kikuchi teaches a template,

although the word template is not used. The functions obtained by the two different

evaluation methods would correspond to more than one template, or different

templates. The selection of one of the methods is made with respect to each of the shot

areas (paragraph 0242 states that the selection of the method of calculation which will

minimize errors is made for each shot ; paragraph 0335 states that the calculations are

carried out for each shot area). Because the shot areas can include alignment marks,

the selection step can select one of the methods with respect to each of the marks.

Kikuchi discloses in addition the following: a method of finding mark positions

in which a determination is made if there are nonlinear components to the error between

shots and if the answer is yes, one method of correction function is

performed(paragraphs 0171, 0172, 0173, and 0174). If there is not nonlinear

component to the error, then a different correction function is used(paragraphs 0223

and 0224). The EGA method is useful for the linear example(paragraph 0296), and the

weighted EGA method is useful for the nonlinear example(paragraphs 0014, 0016, and

313). The EGA method used statistical computation such as least squares

method(paragraph 0008). The position deviations are calculated using sum of squares

calculations(paragraphs 0017 and 0019). The method minimizes the error in the

projection image(paragraphs 230, 0232 and 241) and the apparatus for carrying out

the steps is also disclosed including RAM, lithography apparatus and computer and

exposure apparatus(Fig. 2, paragraphs 0121, 160, 0112, 0169, 0226, and 0228).

Claim Rejections - 35 USC § 103

Claims 27, 31, and 33-37 are   rejected under 35 U.S.C. 103(a) as being

unpatentable over Kikuchi as applied to claim 24 above and further in view of Nishi(US

4,962,318).

Kikuchi is silent with respect to window widths, local maximum slopes, and the

details of the apparatus such as the first and second processing units.

With respect to window widths, it seems from applicant's specification that the window

widths are related to the coefficients of the expressions obtained by the evaluation

methods, which would be within the ordinary skill of the art to obtain mathematical

relationships between the parameters of the process and the coefficients for the

expressions.

With respect to the slope being used in the calculations,

Kikuchi discloses that the equations of the positions in terms of the x and the y

components of the positions are calculated and stored in terms of Fourier series

equations(paragraphs 0196, 0198, 0239, and 0285), which it is known can be related to

the slope, so that it would have been obvious to one of ordinary skill in the art at the

time of the invention to have used the maximum slope calculations because Kikuchi

uses maximum in Fourier series coefficients, which can be related to slope

Kikuchi further discloses the wafer stage which can be positioned (paragraphs 0122 and

0125). Because these expressions would contain nonlinearities, the graphs of these

expressions would contain local maxima or minima, for which one could obtain the

slopes, and because these expressions are different and were obtained by different

methods, they would have different slopes.

With respect to first and second processing units, Kikuchi discloses a CPU(paragraph

0096), and also the apparatus disclosed by Nishi is encorporated by reference by

Kikuchi(paragraph 0135). The apparatus disclosed by Nishi has an operational unit

which determines the position of the shot areas(col. 16,lines 35-41). These values can

be provided to a controller, which in the case of the apparatus taught by Kikuchi would

be the CPU. Nishi further teaches a second unit(col. 18, lines 64-67 and col. 19, lines 1-

9) which provides measured positions and supplies data to the memory, which in the

case of the apparatus taught by Kikuchi would be the CPU. The CPU would then

evaluate the data by the methods discussed in the rejection above.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Caridad M. Everhart whose telephone number is 571-

272-1892. The examiner can normally be reached on Monday through Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, B. Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CARIDAD EVERHART
PRIMARY EXAMINER

C. Everhart
6-29-2006